

**To:** Cindy Osorto[cosorto@blm.gov]  
**Cc:** Sally Butts[sbutts@blm.gov]  
**From:** Rebecca Moore  
**Sent:** 2017-06-01T11:53:55-04:00  
**Importance:** Normal  
**Subject:** FW: Peer-review request  
**Received:** 2017-06-01T11:54:10-04:00

An Analysis of the Economic Effects of the National Conservation Lands 5 17 17 Koontz review.docx

Hi Cindy,  
Lynne's comments came in today. I downloaded and compressed so I could attach it here. I haven't looked at it yet, but let me know if you have any questions.  
-Rebecca

**From:** Koontz, Lynne [mailto:[lynne\\_koontz@nps.gov](mailto:lynne_koontz@nps.gov)]  
**Sent:** Thursday, June 01, 2017 1:35 AM  
**To:** Rebecca Moore <[rmoore@blm.gov](mailto:rmoore@blm.gov)>  
**Cc:** Sally Butts <[sbutts@blm.gov](mailto:sbutts@blm.gov)>  
**Subject:** Re: Peer-review request

Hi Rebecca,

I've completed my review of the report. I found it to be well written and a very informative assessment of the economic benefits of NCLs. I did not find any fatal flaws in the analytical approach to estimating the contributions. The brief descriptions of the methods provided in the report appear to be in line with the methodology needed for this study. The report refers to Appendix A for a more in depth discussion of the methodology which was not included with the attachment. I would be happy to also review the Appendix. There are a couple of sections where the descriptions of contributions and values may cause confusion. I've provided some comments and suggestions in the attached version of the report.

I'm out of the office the rest of this week, back in on Monday.

Thanks,  
Lynne

An Analysis of the Economic Effects of the Nati...

On Fri, May 19, 2017 at 8:14 AM, Rebecca Moore <[rmoore@blm.gov](mailto:rmoore@blm.gov)> wrote:  
Hi Lynne,

I think you are aware that we have been working on a study of the economic impacts and values associated with the National Conservation Lands. Egan Cornaccione, a former intern with the NCL group, completed the analysis and drafted a report, with input from several USGS

and BLM folks. As the analysis uses NPS visitor expenditure profiles, we would appreciate if you or Leslie could provide a peer-review of the report, which is available at:

<https://drive.google.com/open?id=0B8akMDfZmooQZU5NVTa1OGkydVk>

While any comments are appreciated, we are specifically interested in the following:

- Fatal flaws in the analytical approach to estimating contributions
- Additional information needed to transparently describe the methodology
- Any comments/concerns regarding the clarity and accuracy of how the basic concepts of contributions and values are presented and related to each other.

We are under some pressure to get this out and are asking for comments by June 2. Of course, sooner would be better if you have time.

Let me know if this is possible, and thanks in advance if it is.

-Rebecca

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Rebecca Moore, PhD  
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Lynne Koontz, PhD

Economist

Social Science Program

National Park Service

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Visitor Spending Effects: <https://www.nps.gov/subjects/socialscience/vse.htm>

Prepared by Egan Cornachione

GeoCorps Intern with the Bureau of Land Management, Division of National Conservation Lands

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-An appendix to this report with additional information is available upon request.-

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Executive Summary

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An Analysis of the Economic Effects of the National Conservation Lands

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**NATIONAL  
CONSERVATION  
LANDS**

## An Analysis of the Economic Effects of the National Conservation Lands



February 17, 2017

## An Analysis of the Economic Effects of the National Conservation Lands

May 2017

many ways to understand how protected public lands fit into regional economies and the benefits they provide to people. This report explains several economic concepts important to understanding the National Conservation Lands. It then provides quantitative estimates of the economic contribution provided by visitor spending at some National Conservation Land units, and a qualitative discussion of how the values provided by NCL units could be identified and measured. This report includes:

1. A discussion of the economic theory and concepts related to the National Conservation Lands:

- Clarifying the distinction between economic value, contributions, and impacts; defining ecosystem services; and explaining a total economic value framework.

2. Economic statistics, facts and stories that can be used to discuss the economic effects of these lands:

- Assessing the **economic contributions** of National Conservation Lands. Based on a peer reviewed model described within this report, visitors to National Monuments, National Conservation Areas (NCAs), and similarly designated units spent nearly \$460 million on trip related purchases in 2016. This contributed an estimated \$630 million in economic activity, 7,100 jobs, and \$230 million in incomes to state economies. This supports a return of \$17 of regional economic output per \$1 of program funding.
- Analyzing trends in **visitation** to units. Visitation to National Monuments, NCAs and similarly designated units increases at an average rate of around 5.4% per year. Comparatively, visitation to all BLM recreation sites increases at around 1.3% per year.
- Describing the **nonmarket values and ecosystem services** of the National Conservation Lands. Many of the National Conservation Lands are free to use and they protect valuable resources not bought or sold in markets, so their benefits are calculated through *nonmarket valuation* methods. For example, the recreational opportunities at the Deschutes Wild and Scenic River are valued at over \$29 million in economic use value for 2016.

3. A demonstration of how the economic concepts and statistics generated in this report may be applied for future uses and analyses:

- Analyzing a single National Monument as a case study. This demonstrates how the statistics, economic concepts and framework provided in this report can be applied to an individual unit.
- Providing examples of economic cases from different National Monuments and NCAs.
- Developing a website, fact sheet, and appendix to this report in order to share the economic benefits of the National Conservation Lands with other part of the agency and the public.

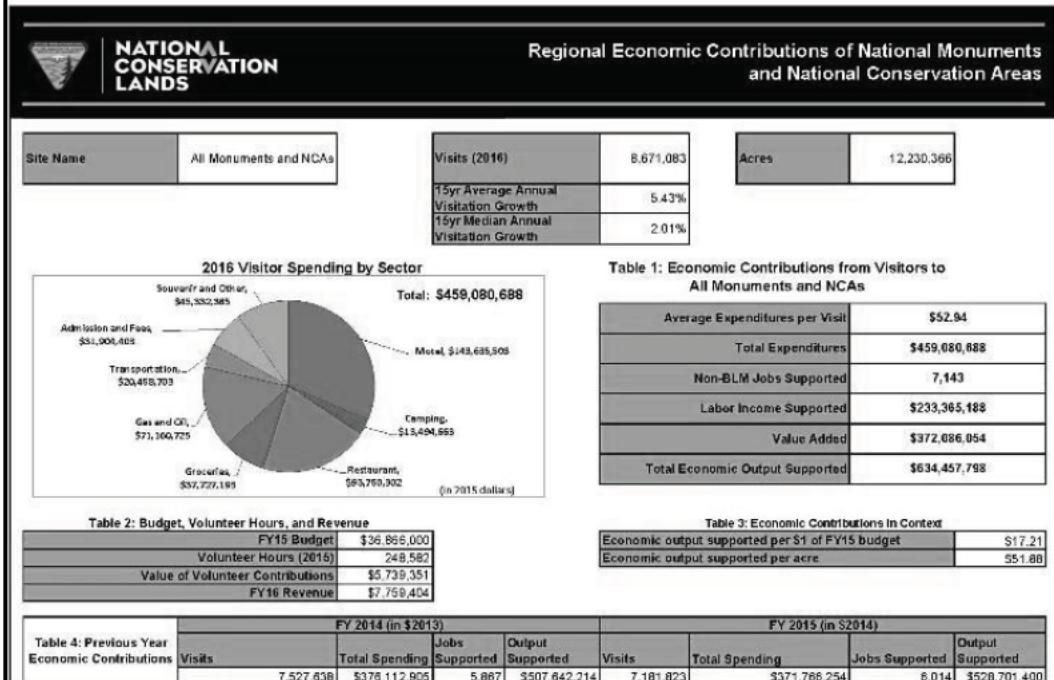
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## At-A-Glance: Economic Contributions of National Monuments and National Conservation Areas

The figure below shows the visitation and associated visitor spending at all National Monuments and National Conservation Areas in 2016. The expenditures within 50 miles of a site were calculated by using recreation visitor spending profiles generated from the National Park Service. Jobs supported, labor income, value added, and economic output for each state's economy were calculated from IMPLAN economic modeling software.

(b)(5) DPP



Sources: Visitation and visitation growth data were gathered from DOI's Recreation Management Information System (RMIS), as accessed on December 2016. Acreage, budget, and volunteer hours are as reported in BLM FY15 Managers' Reports. The Value of Volunteer Contributions was calculated using state-by-state value per hour of volunteer time from <https://www.independentsector.org/volunteer> time. Economic contributions results were estimated by assigning visitor characteristics and spending patterns based on visitor surveys of the nearest National Park Service unit (based on data from Thomas and Koontz 2015: <https://www.nps.gov/nature/customcf/NPS%20Data%20Visualization/NPS%20VSE%202015%20FINAL.pdf>). Contributions results were calculated from IMPLAN economic modeling (<http://implan.com/>). Visitation growth rate may be based on fewer than 15 years due to data availability.

## An Analysis of the Economic Effects of the National Conservation Lands

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**Section 1: Introduction**

This report addresses the economic effects of the Bureau of Land Management's (BLM) National Conservation Lands. The public benefits and economic contributions of National Conservation Lands to local, regional and national economies are of interest to a wide range of stakeholders, including the BLM and other federal decision makers, business groups, and local communities. This peer reviewed report and the statistics generated from it are intended to be used as a resource for those interested in economic questions related to the National Conservation Lands.

The National Conservation Lands are a system of 876 federally recognized units, comprising nearly 36 million acres. They include:

- 27 National Monuments like Fort Ord National Monument in California;
- 21 NCAs and similarly designated units such as Yaquina Head Outstanding Natural Area;
- 223 Wilderness Areas such as the Bisti/De Na Zin Wilderness in New Mexico;
- 517 Wilderness Study Areas;
- 69 National Wild and Scenic Rivers; and
- 18 National Scenic and Historic Trails.

This report focuses primarily on National Monuments and NCAs because they are the only areas for which consistent visitation data are available. However, the economic concepts described in this report could be applied to all of the protected public lands designations of the National Conservation Lands. National Monuments and NCAs are designated either by Congress or the President to conserve culturally and scientifically important resources, objects and values for the benefit of current and future generations. This report addresses how these resources, objects and values provide an accessible framework for analyzing the economic value of units.

Designating a National Monument or NCA prioritizes conservation on these lands and as such, their value stems from the conservation related activities and resources on these units. Typically, leases for the many forms of resource extraction are withdrawn once an area is designated as a National Monument or NCA, but valid existing rights are honored and other activities that are compatible with the designation are allowed. This means that several sources of *market* values associated with BLM managed lands generally do not occur on National Conservation Lands. Conservation related activities, however, provide other types of economic value. For example, one of the most visible benefits of protected lands comes from their recreational values. Many monuments have become or are becoming high profile destinations for tourists who spend hundreds of millions of dollars annually on trip related purchases. Grand Staircase Escalante National Monument in Utah has grown from hosting just over a half million visits in 2000 to nearly a million visits in 2016.

As nationally treasured landscapes, the National Conservation Lands are also valued by many people who may never visit the units but place importance on protecting the land and its resources (Loomis 2000). Many areas are attractions for out of state and foreign tourists who support regional economies by travelling through areas with protected public lands and purchasing local goods and services. Beyond these recreation values, monuments and NCAs provide other important services that can support local economies. Studies have directly or indirectly linked positive trends in home values, lower water bills, reduced frequency of natural disasters, and increased local crop productivity to the

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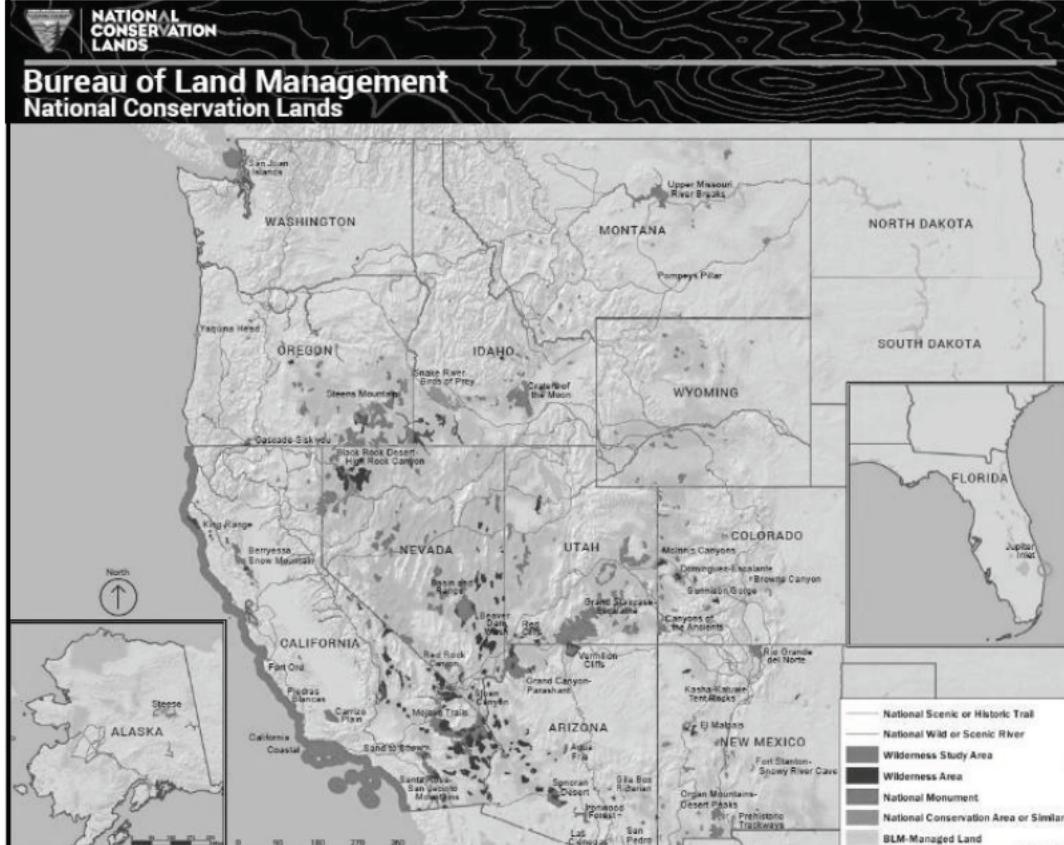
presence of protected public lands (Taylor et al 2012, Gosnell and Abrams 2011, Ricketts et al 2008 and Rasker 2012).

This report is intended for a variety of stakeholders and may be useful in several contexts. Within the BLM, the information may be useful for planners analyzing the socioeconomic effects of projects or policies relating to the National Conservation Lands. The information in the results section of this report provides statistics for communicating regarding the economic activity and economic value of the National Conservation Lands. The definitions, explanations, and examples of various economic concepts contained within this report are intended to aid non specialists in understanding the economics of the National Conservation Lands. Finally, the framework for evaluating the economic effects of a new designation and monument case study may be used to inform planning and address local and regional economic concerns relating to a designated unit.

DRAFT

## An Analysis of the Economic Effects of the National Conservation Lands

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## Section 2: Economic Concepts Relevant to the National Conservation Lands

## 2.1: Defining Economic Value and Economic Contributions

**Commented [KLM3]:** Having contributions (one of two measures of economic activity) as part of the overall section title may be confusing to readers less familiar with these concepts. Labeling this "regional economic activity" might help set up the overall discussion.

## An Analysis of the Economic Effects of the National Conservation Lands

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There are a variety of ways to consider how National Conservation Lands might affect economies or people. One common question considers the values, or benefits, provided. Economic value, or benefit, is a measure of individual or societal well being. The economic value of the NCL could be measured in terms of how much people would be willing to give up in order to maintain the services these lands provide.

A second common question considers the effect of NCL on local or regional economic activity. This is distinct from the concept of value, as economic activity specifically refers to the production, distribution, and consumption of goods and services. The *economic contribution* of a particular industry is typically measured in terms of the economic output generated, or jobs supported, by that industry. An *economic impact* refers specifically to the change in economic activity resulting from an action, for example, the changes in economic activity due to creation or change in the nearby NCL unit [REDACTED]

## Defining Economic Terms:

*Value*: The benefits to individual or societal well-being.

*Economic activity*: The production, distribution and consumption of goods and services in a specified region.

*Contribution*: The economic activity generated from an action, often measured in jobs or economic output.

*Impact*: The change in economic activity resulting from a particular event, often measured in jobs or economic output.

(b)(5) DPP [REDACTED]

Economic value and economic contributions are two separate concepts that describe important aspects of how NCLs [REDACTED] local communities. An economic contribution analysis measures how economies are [REDACTED] by NCLs, while an economic valuation study measures how people are affected by the resources provided by the lands, as represented by their willingness to pay for these resources. Economic contributions can fit into a discussion of economic value but they are, quantitatively, measuring two different things. This report provides quantitative estimates of the economic contribution provided by visitor spending at some NCL units. It also provides a qualitative discussion of how the values provided by NCL units could be identified and measured.

## 2.2: Types of Economic Values

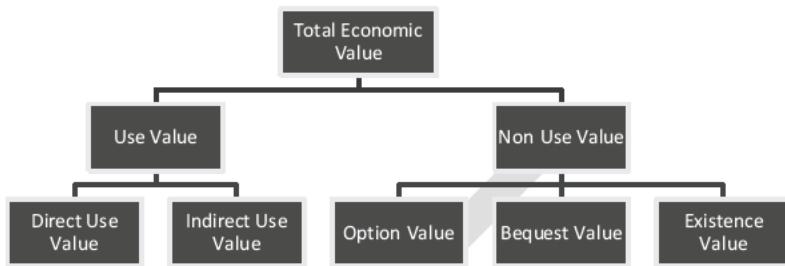
The economic value of NCL are the benefits provided to individual and societal well being. These benefits can vary across locations, across time, and across different groups of people. This variation can present important policy or management challenges and affect which values are most relevant to a particular decision. For example, the benefits of providing a clean water source to a neighboring community are relatively local, while the existence value associated with protecting an endangered species might be global. The decision context will determine if and how these values should be considered.

Economic values can be characterized several different ways. Some values are associated with land uses, including *direct use* of the resource (e.g., boating or mineral withdrawal) and *indirect* use of the resource (e.g., wetlands provide water filtration services which benefit downstream users). Other values are termed *non use values* because they do not require use of the resource. Examples include valuing the existence of a resource or retaining the option of future use. NCL units have components of

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direct use, indirect use and non use values. Figure 1 shows total economic value, measured as the sum of all of these values.



**Figure 1. Total Economic Value (Adapted from Huber and Richardson 2016 and Loomis 2002)**

Economic values also differ by *how* values are generated. Analysts can estimate some values, such as commodity values, from market data describing buying and selling patterns of the commodity. However, many values associated with conservation, such as habitat protection, are not directly captured in market activity. These resources are not conventionally bought and sold, and must be measured indirectly by methods such as observing markets of related goods, or by creating a hypothetical market in which to observe choices. National Conservation Lands protect a vast number of scientific, cultural, habitat, geologic, and archaeological resources, among many others. Most of these resources are not purchased or sold in markets in the same way as other BLM managed resources like oil, timber, minerals and coal. Since National Conservation Lands have few existing leases for these market valued resources, nonmarket values constitute a significant portion of the values associated with the management of the National Conservation Lands.

**Table 1. Defining Use vs. Non Use Values and Market vs. Nonmarket Values**

Direct Use Value	Direct use values require direct interaction with the resource or land. For example, recreation, mineral extraction and water withdrawal are all values captured by directly using the resources provided by the land.
Indirect Use Value	Indirect use values do not require direct interaction with the resource or land. For example, a healthy water supply may be supported by groundwater recharge within a National Conservation Lands unit. People reap this clean water supply benefit without physically interacting with the land, making it an indirect use value.
Non Use Value	Non-use values are benefits derived without using the lands' resources either directly or indirectly. There are three main categories of non-use values: <i>Existence Value</i> : valuing the current intactness of a landscape and its resources without using them.

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	<p><i>Option Value:</i> valuing a landscape or resource for having the option of using it at some point in the future.</p> <p><i>Bequest Value:</i> valuing the continued existence of a resource for use by future generations.</p>
<b>Market Values</b>	Competitive markets provide information on sales and purchase decisions for many goods and services. Values of these market goods and services may be calculated by observing and analyzing market decisions.
<b>Nonmarket Values</b>	Many goods and services provided by National Conservation Lands are not traded in markets and thus are not valued through market activity. Goods and services such as clean air, pristine views, and the values ascribed to recreational experiences are examples of nonmarket values. The public values these resources or activities, but they are not usually sold or purchased. These nonmarket values may be measured or explained both quantitatively and qualitatively by a variety of economic techniques.

### 2.2.1 Nonmarket Values

BLM Instruction Memorandum (IM) 2013 131 provides administrative guidance for integrating nonmarket values into planning processes. Although nonmarket values may be challenging to measure, the guidance states that EIS level NEPA analyses must include consideration of nonmarket values where relevant and feasible. The impetus for this mandate is that if nonmarket values are not included in an analysis when they do in fact exist, then planners or decision makers are implicitly devaluing a public good rather than applying the best available science on public values. From the IM:

*"All BLM managers and staff are directed to utilize estimates of nonmarket environmental values in NEPA analysis supporting planning and other decision making where relevant and feasible, in accordance with the attached guidance. At least a qualitative description of the most relevant nonmarket values should be included for the affected environment and the impacts of alternatives in NEPA analyses involving environmental impact statements (EIS), for both resource management plans and project level decisions..."*

The guidance goes on to enumerate the three criteria that determine whether a quantitative nonmarket valuation is warranted.

1. *A proposed action is likely to have a significant direct or indirect effect (as defined at 40 CFR 1508.8 and 1508.27), and the quality or magnitude of the effect can be clarified through the analysis of nonmarket values. For example, a proposed wind energy installation may affect the viewshed of a nearby community in ways that alter scenic values.*
2. *The alternatives to be considered present a strong contrast between extractive and non extractive uses of land and resources. For example, an RMP may include alternative resource allocations that vary between managing land primarily for oil and gas development or managing it for habitat conservation and recreation.*

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*3. The magnitude of the proposed change is large. An example could be the difference between a maximum allowable oil and gas development of 250 wells under the no action alternative and 2,500 wells under the intensive use alternative."*

In the case of decisions involving National Conservation Lands, the designations often restrict the types of future allowable uses of the land. Similarly, given the many resources, objects and values that National Conservation Lands are managed to protect, project decisions may have a significant direct or indirect effect on these values as described in the first criterion above. Cases such as these present management challenges that may be addressed through the inclusion of nonmarket values in decision making.

#### 2.2.2 Ecosystem Services:

One useful concept for considering the full range of values provided by protected public lands is that of ecosystem services, which are generally defined as the benefits provided to people by nature. Ecosystem services include both market and nonmarket goods and services, and have both use and nonuse value. This concept bridges the historical divide created between the economy and the environment by describing the connection between the two. Not all values related to National Conservation Lands are ecosystem services, but many are. These values may be classified into the four categories identified below (Millennium Ecosystem Assessment 2005).

##### Four Categories of Ecosystem Services (Millennium Ecosystem Assessment 2005)

- *Provisioning Services*: Providing food, materials, or other resources that are used to meet the needs of people.
- *Regulating Services*: Protecting the population from natural disasters such as floods; maintaining healthy air quality.
- *Supporting Services*: Providing resources for wildlife, and preserving biodiversity in ecosystems.
- *Cultural Services*: Ensuring an emotionally, spiritually, and physically healthy population; offering recreation opportunities.

Conservation is a management objective that contributes to the BLM's multiple use and sustained yield mission and requires adequate consideration of the economic value of these services in decision making. Executive Branch guidance issued in October 2015 "directs agencies to implement {ecosystem services} policies and integrate assessments of ecosystem services, at the appropriate scale, into relevant programs and projects, in accordance with their statutory authority" (Executive Office Memorandum M 16 01). The BLM is currently developing additional guidance for considering ecosystem service values in NEPA analyses and planning efforts in response to this order. As this guidance is released, it will become necessary for planners to consider ecosystem services where relevant to decision making (PCAST 2011). In cases involving National Monuments and NCAs, the resources, objects and values for which the units are designated are a useful starting point for understanding ecosystem services at the unit level

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***Featured Unit: Grand Staircase Escalante National Monument***

BLM's first monument, Grand Staircase-Escalante in southern Utah, exemplifies many concepts of economic value.

*Recreational Value*

Throughout the year, numerous guide services take visitors into the monument to experience its outstanding recreational opportunities. The monument had 117 active Special Recreation Permits (SRPs) in 2016. Many of these permits were for commercial outfitters who often attract non-local and even foreign tourists for multi-day stays in the area. The Escalante Canyon Art Festival, an event lasting over a week each fall in the monument, brought in more than 5,000 people from over fifteen states and three countries to stay in the area in 2016.

*Educational Value*

Escalante Partners, an official nonprofit partner organization of the monument, provides several free resources for educators across the state, including "Discovery Trunks." These trunks, developed from the unit's geologic resources, offer an integrative way for students to learn about the geology, archaeology and paleontology that Grand Staircase Escalante conserves.

*Scientific and Paleontological Value*

Grand Staircase-Escalante provides a staffed paleontological laboratory with 10 work stations open to volunteers who can help with the preparation of the unit's remarkable fossil discoveries. Over 500 journal articles have been published about the monument and its resources, a collection of which is available for public access through the Gerald H Sherratt Library at Southern Utah University.

*Wildlife/Habitat Value*

Grand Staircase-Escalante encompasses nearly 2 million acres in the Colorado Plateau, a region that conserves over 550 different species of pollinators. Pollinators are crucial to agricultural production. Pollinators contributed an estimated \$29 billion in economic output nationally for farms in 2010 (Calderone 2012).



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**2.3 Regional Economic Contribution Analysis**

As described above, economic contributions refer to the effect of a particular activity on economic activity. As such, an economic contribution analysis can be used to estimate the activity generated in a specific geographic area due to money spent by visitors to an NCL unit. In a contribution analysis, an input output (IO) model describes the linkages among different sectors of an economy and tracks the flow of goods and services from their production to their sale. For example, consider \$100 spent at a local restaurant as part of a National Conservation Lands visit. Of that \$100, perhaps \$40 is used to purchase ingredients from the local region, \$30 goes towards rent and building maintenance and \$30 goes towards wages and profit. All \$100 of visitor spending is a direct effect because the money stays within the region. Looking specifically at the \$40 going towards ingredients, businesses that sell ingredients to the restaurant are indirectly affected and they, too, will spend that money on various inputs. These are called indirect effects. In the case of the \$30 of wages, some of that money will be spent by the employees on various necessities in the same region, leading to "induced" effects. The direct, indirect and induced effects are traced throughout the economy until all dollars are either saved or spent outside the economy.

This report uses IMPLAN, an IO modeling software, to estimate regional economic contributions (IMPLAN 2016). IMPLAN is used by many federal agencies to perform analyses of regional economic contributions (Thomas and Koontz 2016). In the case of visitor spending analysis, the "activity" is the spending related to National Conservation Lands visits. The outputs generated from visitor spending are measured by the following (adapted from Thomas and Koontz 2016):

*Jobs*: the annualized full and part time jobs.

*Labor Income*: all forms of employment income, including wages, benefits, and proprietor income. Labor income represents a portion of the amount reported for value added.

*Value Added*: the contribution of visitor spending to the Gross Domestic Product (GDP) of a regional economy. Value added is equal to the difference between the sale price of all goods sold and the production value of the goods. In other words, if a consumer spent \$100 at a motel and the operational and material expenses of the business to provide that room were \$40, then \$60 of value is added to the economy upon the item's sale.

*Output*: the total production value of goods and services supported by visitor spending. It is the sum of consumer purchases, exports, and intermediate sales between businesses.

**Section 3: Considering the Economic Value of National Conservation Lands****3.1: Identifying values provided by National Conservation Lands**

One of the first steps in analyzing the value of a National Conservation Lands unit is to identify the full range of values the unit provides. These values may be local or national in scope and do not always require direct use of the resource. They can vary across locations, time and different groups of people. Concepts like ecosystem services, use and non use values, and market and nonmarket values

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can helpful in creating and organizing this list. Information gathered from resource specialists, public engagement, and other sources is essential to identifying these values. For National Monuments and National Conservation Areas, the resources, object and values identified in the creation of the unit can also assist with this process.

Some values are more easily quantified than others, but according to BLM IM 2013 131, “the most relevant nonmarket values” should be considered when a decision is found to warrant nonmarket valuation. In planning or in project assessments a qualitative description of the values may be used when no quantitative data is available (BLM IM 2013 131). Appendix C describes some valuation methods that are most relevant to the values provided by National Conservation Lands. Appendix B describes one specific method, benefit transfer, which is used in this report. Most valuation techniques require the support of a professional economist, the information in Appendices can aid a non specialist in identifying and describing economic values of a unit, and understanding possible approaches to valuation.

### 3.1.1: Resources, Objects and Values

Each of the 48 BLM National Monuments and National Conservation Areas is designated to conserve specific resources, objects and values (informally called ROVs). Table 2 shows the number of units designated to protect different types of ROVs. The most common values the units are designated to protect are cultural, wildlife habitat, and scientific. Although all units offer recreational opportunities, not all sites are designated specifically to conserve recreational values.

Each type of resource, object and value for which a unit is designated has an associated economic value because they are *worth* something to people. With cultural resources, for example, visitors value the opportunity of getting to see, touch, or experience a preserved cultural site. Additionally, local residents who value a strong community and maintaining cultural ties may receive an indirect benefit from this use of the resource, as values associated with a sense of place are enhanced by having access to the site. Additionally, people who live far away from the site but who value it will likely benefit from knowing that the site is preserved (a non use value). Table C2, in Appendix C of this report, provides a guide for identifying, describing and, possibly, quantifying the economic value of National Monuments and NCAs through the direct use, indirect use, and non use values of the units' resources.

Although ROVs are not identified for all other NCL units, a similar framework could be used as these units may have values associated with a particular ROV.

Resource, Objects and Values	Number of Units Designated to Protect ROV
Cultural	34
Habitat/Wildlife	33
Scientific	32
Paleontological/Geological	27
Vegetative/Ecological	25
Recreational	19
Riparian/Water	19
Educational	18

**Table 2: Resources, Objects and Values of National Monuments and NCAs**

<p>An Analysis of the Economic Effects of the National Conservation Lands</p> <p>May 2017</p> <p><b>3.1.2 Values Related to Local Economic Opportunity, Stability, and Diversity</b></p> <p>One subset of values that should be considered relates to the effect of National Conservation Lands on local and regional economies. A strong, diverse, and stable economy is of value to a local community and public lands contribute to this value. Although this value is not easily quantified, a regional economic contribution analysis is one useful tool to aid in understanding the value of local economic opportunity. The jobs, labor income, value added, and economic output supported by National Conservation Lands visitors and other events taking place on the lands do not represent an economic value but they are useful in understanding the total value of the units.</p> <p>many jobs are supported by monument visitation in a relatively small local economy, then the monument provides a great amount of economic opportunity. If there are many additional types of employment in the community, then the monument also supports a diverse local economy. Finally, visitation to BLM sites tends to increase over time (RMIS 2016). The continued or sustained economic activity generated as a result of this visitation supports economic stability.</p> <p>The literature also cites several other examples besides tourism of how a protected public land designation can affect local economies. While direct quantification is difficult, discussion of these effects can be important to understanding the total value of a NCL unit.</p> <ul style="list-style-type: none"> <li>• <b>Amenity migration:</b> retirees, skilled workers, and businesses are attracted to communities with large amounts of protected public land (Gosnell and Adams 2009).</li> <li>• <b>Changes in Property Values:</b> home values increase in relation to their proximity to protected public lands, all other factors being equal (Taylor et al 2012, Izon et al 2010, Phillips 2004).</li> <li>• <b>Tax Revenues:</b> spending associated with visitation generates local tax revenues from sectors such as retail trade, accommodation and food services, and arts, entertainment, and recreation.</li> </ul>	
<p><b>Example: The Economic Effect of a Rock Climbing Conference</b></p> <p>Many large conferences and events take place on National Monuments and NCAs as a result of the incredible objects and values they conserve. Red Rock Canyon National Conservation Area hosted the Mountain Gear Red Rock Rendezvous in April 2016. According to Christensen Research Company, 97% of attendees came from outside the Las Vegas area and 43% flew in for the event. The three-day event brought in an estimated \$1 million in festival-related spending to the Las Vegas economy. These expenditures do not directly measure value, but they do reflect a key component of the total value of the unit: contributing to a stable and diverse local economy.</p>	<p><b>Amenity Migration in Action</b></p> <p>Many National Monuments and National Conservation Areas can now be reviewed on Yelp. These reviews can provide useful insight into what motivates people to visit units. One reviewer who identified as a Las Cruces resident, called Aguirre Springs National Recreation Area, a unit within Organ Mountains-Desert Peaks National Monument, "...one of my favorite places in Las Cruces." Another review states, "this place is one of the reasons I moved to [Las] Cruces." Comments like these provide evidence that monuments are not only important to tourists, but they influence residents' decisions to locate in a particular area.</p>

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**3.2: Visitation as a Key Factor of Value and Contributions**

Visitation is a key factor in both economic value and economic contributions of NCL units. While visitors are not the only ones to value NCL, their values can represent a large component of the total value. Similarly, visitor spending is a primary input to an economic contribution analysis. Because visitation is so central, it can be useful to the factors most likely to influence visitation to a unit. Visitation to designated NCL units is increasing at an average annual rate of 5.4%, and many National Monuments and NCAs are becoming popular tourist destinations for visitors from the United States and abroad. Increased visitation often (but not always) leads to increases in value and contribution.

Visitation to a unit depends on a number of factors. Table 3 lists some of the factors that may be most relevant to NCL units. These factors may be evaluated to help characterize the short and long run visitation prospects of management decisions, or even a potential new designation.

**Table 3: Factors Influencing Unit Visitation**

Type of amenities and recreation opportunities offered at the unit	The type of recreation a unit offers influences the degree to which it attracts visitors. The most participated-in activity across all BLM sites in 2016 was education, interpretation and nature study, followed by non-motorized travel and camping/picnicking. Visitors choose to travel based on what recreation sites offer for their experience. A survey of Texas State Parks visitors asked visitors to rate the importance of various amenities in attracting them to a park on a scale from 1 to 5. They found that "pretty scenery" (4.40 average value), "historical sites" (3.90), "interesting wildlife" (3.57), "good highways" (4.29), and "providing a good value" (4.57) were most important to visitors (Walker et al 2005). National Conservation Lands amenities such as visitor's centers, educational displays, interpretive programs, boat launches, and paved roads all very likely play a role in bringing visitors to the monument.
Urban / Rural location	Proximity to urban areas is important, as about half of all visitors to BLM lands travel less than 50 miles from home to reach their recreation site according to data from the 2006 and 2009 BLM National Visitor Use Monitoring Process (White nd). Non-local visitors spend the most money on their visits, although locals still generate economic activity on their trip-related expenditures (Thomas and Koontz 2016). Additionally, units located less than 50 miles from major population centers are more likely to experience visitation growth, as they benefit from the ease of access (Rasker et al 2009).
Population served	Demographics are an important factor in visitation. The most common visitors to natural areas are white, male, older, and have higher incomes. The most recent survey of United States Forest Service visitors found that 95% of visitors are white, 52% are over 40, 63% are male, and 72% had household incomes greater than \$50,000 (USFS 2015). These statistics are useful in understanding which groups use National Conservation Lands and which populations may perhaps be better served by public lands in the future.
Resources, Objects, and Values of Designation	The ROVs of a designation establish management objectives for the unit. Demand for different resources varies across time, space, and different populations. Additionally, conservation objectives may compete with visitation growth. For example, Wilderness Areas must, by designation, be roadless areas (Wilderness Act of 1964). A lack of development helps protect the wilderness qualities and conserve the important resources of an area, but it can also hinder visitation growth by limiting opportunities for human access.
Ease of access/ transportation	A 2015 report by Headwaters Economics found that rural counties that are "connected" to major metropolitan centers fare better in major economic performance indicators than "isolated" counties (Rasker et al 2009). A connected county was defined as having a population center within one-hour commuting distance of the nearest airport with daily passenger service. As a result of this relationship, units that are more easily accessible either from roads or major airports may experience greater visitation. This is an important factor to consider when analyzing the potential effects of a designation. If the unit is accessible by a major highway and connected to large population centers by an airport, it may be more likely to experience greater visitation than a similar unit that is less connected.

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Substitutable recreation sites	The most recent survey of National Forest visitors found that 60% of visitors in the western United States regions indicated that they would travel somewhere else for their visit if they were not able to visit the Forest Service unit they had chosen as their destination. Of these 60% of survey respondents, 36% indicated they would only travel up to 25 miles to their "substitute" site (USFS 2015). People were comparatively less willing to travel greater distances to travel to a substitute destination. A site with fewer substitutes- especially within a 25-mile proximity- makes visitor demand more inelastic, meaning they would pay more for a similar amount of recreation opportunities since they cannot easily shift their consumption away from the unit. This would theoretically increase the value per visitor of having recreation opportunities at the unit, although it may not impact economic activity. On the other hand, areas with many substitutes may attract visitors who spend time at multiple units. A higher availability of substitutes may increase visitation to a unit that might otherwise be less-visited. While the number of available substitute recreation sites may not directly explain why certain areas are more or less visited than others, it is an important part of explaining patterns in visitation and planning for future changes.
Local partnerships, knowledge, and activism	Active partnerships with local organizations are highly important in garnering public interest and visitation to monuments. For example, the Las Cruces Green Chamber of Commerce helped put on a "Monuments to Main Street" event which hosted several activities on the Organ Mountains-Desert Peaks National Monument. These kinds of events directly bring people to monuments that otherwise may not have visited without the support of the local community. Thanks in part to the activism of local community members, the Las Cruces area has seen five consecutive years of tourism growth (Tourism Economics 2016). Additionally, partnerships with schools, local officials, and businesses all may help to attract visitors. National Conservation Lands units with these partnerships may be more capable of attracting visitors. Many units have partner groups included in the Conservation Lands Foundation's "Friends Grassroots Network." Groups in this network have access to grants and funding that can assist them in providing resources to improve visitor experiences on the units.

**3.3: Economic Value or Contribution of a New Designation**

An important question that the National Conservation Lands often face regards the impact a new designation would have on local communities and economies. A monument or NCA designation can, in some cases, impact the growth potential of different economic sectors by prohibiting certain new uses of the land. Understanding if and how these impacts might occur is an important consideration. A positive economic impact may be generated from increased tourism after the designation of a unit. The naming of a designation can affect a location's recognition and the amount of visitation it receives. Weiler and Seidl (2004) demonstrated that annual visitation to National Park Service units that were formerly designated as National Monuments increased significantly after they were re designated as National Parks, controlling for other factors that might impact visitation. Although National Parks and BLM National Monuments are not directly comparable, the study provides evidence that the naming of a public land designation is important, and visitation may increase in response to a more recognizable monument naming. The increased visitation after a designation brings additional visitor spending and generates additional economic activity in the region.

A 2011 study by Headwaters Economics, updated in 2014, analyzed the economic performance of counties surrounding National Monuments designated since between 1982 and 2000 with a size greater than 10,000 acres. In the communities surrounding each of the thirteen BLM National Monuments analyzed, trends in population, employment, personal income, and per capita income all increased after the monuments were designated. Two thirds of communities surrounding the seventeen total

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monuments studied grew at the same or faster pace as similar counties in the states of the designations (Headwaters Economics 2014).

To be clear, the peer reviewed literature shows that the described effects *can* be associated with a designation, not necessarily that this is the case in every community. BLM National Monuments and NCAs vary considerably in their size, amenities, and visitation. For example, the smallest unit, Piedras Blancas Historic Light Station, sits on only 18 acres on the California Coast, while the largest unit, Grand Staircase Escalante (GSENM), encompasses almost 1.9 million acres. These two sites also demonstrate the range of contrast in visitation among sites, as the light station attracted less than 10,000 visits in 2016 while GSENM hosted nearly 1 million visits. Additionally, some sites are in very remote areas, while others are just miles from some of the largest cities in the west. Given the wide variety of National Conservation Lands unit types, locations and recreation opportunities, it is impractical to draw generalizations about the economic effect a designation can have on a community. While there is evidence that National Monuments and NCAs can positively affect local economies after designation, the likelihood and magnitude of these effects depends on many different factors.

***Designation Effect: Rio Grande del Norte NM***

Rio Grande del Norte, a vast unit outside of Taos, New Mexico, saw visitation jump from 111,000 in 2012 to 166,000 in its year of designation in 2013. This nearly 50% increase in visitation helped boost Taos' Accommodations and Food Service tax revenues by a half million dollars from the previous year. Retail Trade tax revenues increased nearly 10% or \$850,000 between 2012 and 2013. Though not all necessarily attributable to the monument designation, these revenues were likely supported by the visitation boost from its designation.

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**Section 4: Results and Discussion****4.1: Key Findings**

- ✓ Visits to National Monuments and NCAs have grown at over 4x the rate of all BLM recreation sites in the past 10 years
- ✓ Visitors to National Monuments, NCAs and similarly designated units contributed nearly \$460 million in visitor spending, \$230 million in labor income, \$360 million in value added and over \$630 million in economic output to states' economies in 2016. These results are broken down for each state and each unit in 2016.
- ✓ National Monuments and NCAs contributed \$17 of economic activity per \$1 of funding and over \$50 of economic activity per acre, compared with \$2.73 per acre of funding
- ✓ Wilderness Areas, WSAs, National Scenic and Historic Trails, and National Wild and Scenic Rivers contributed a significant additional amount in economic activity not included in this analysis.

Examples of contributions from these programs include:

- \$11 million in output supported by BLM Wilderness Visits in 2015
- \$2.5 million in output supported by the National Historic Oregon Trail Interpretive Center in 2016
- \$15 million in output supported by the Deschutes Wild and Scenic River in 2016

***BLM Revenues from National Monuments and NCAs***

- ✓ Red Rock Canyon and Sloan Canyon NCAs in NV brought in over \$3 million in revenue for BLM in 2016.
- ✓ Almost \$7.8 million in revenue was collected from recreation, lands and realty, range management and other programs in 2016 from the 32 Monuments and NCAs that reported unit collections in BLM's Collections and Billing System.

**4.2: Visitation**

Given the importance of visitation to both values and contributions, this report first summarizes visitation to BLM's National Monuments and NCAs. In 2016, there were over 8.6 million visits to BLM National Monuments and NCAs.<sup>1</sup> Visitation ranges from 120 visits to Basin and Range NM (NV) to over

<sup>1</sup> The openness of BLM's recreation sites presents significant challenges to counting visits. At many units, a combination of vehicle counters, trail registers, and surveys is used to estimate visitor counts.

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2 million visits to Red Rock Canyon NCA (NV). Figure 2 shows 2016 visitation to each National Monument and NCA compared to the size of the NCL unit. While most units are less than 600,000 acres and report under 400,000 visits, there are some notable exceptions.

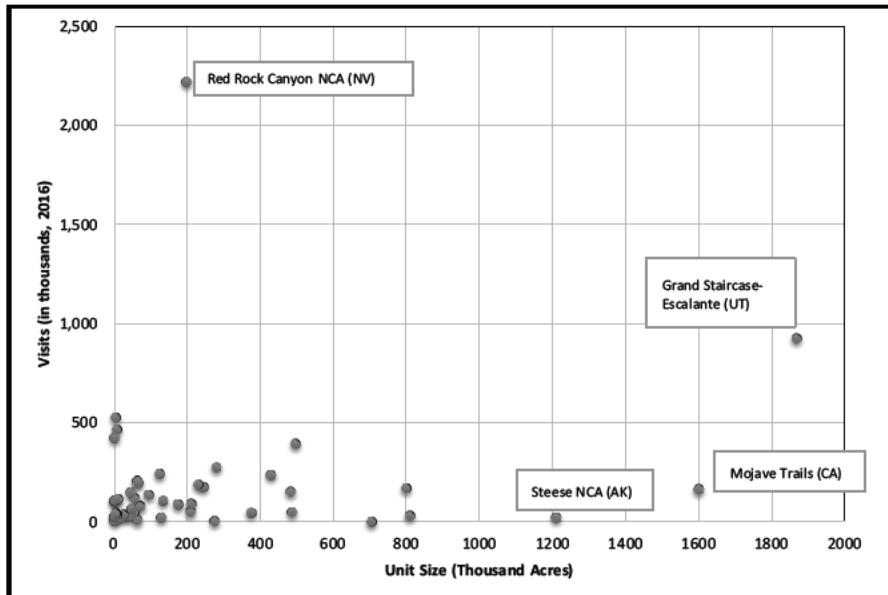


Figure 2. 2016 National Monument and NCA visitation by Unit Size

One potential value of National Conservation Lands is the opportunity for economic activity to be generated from tourism for an indefinite period of time. The economic contributions occur annually, and in cases where visitation increases over time, recreation generates additional activity each year that visitation increases. In the past ten years, visitation to all BLM sites has grown at an average rate of about 1.3% (RMIS 2016).<sup>2</sup> Comparatively, during that time, visitation to National Monuments and NCAs that have tracked unit level visitation since 2005 has grown at an average rate of about 5.4% per year. This includes all visits to current units, including visits made prior to official designation, so the increase is not simply attributable to the addition of new units. This higher growth rate can lead to significant additional economic activity over time when compared with a site that is not a National Monument or NCA.

<sup>2</sup> Between 1999 and 2016, there were 607 data points of the annual percentage change in visitation at each monument and NCA designated before 2013. Of these data points, 68 showed that visitation had either doubled or halved between years at a unit. These data points were considered outliers, likely representing a change in estimation methods or new staff on the unit. All average visitation change estimates were calculated under this assumption.

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The economic importance of visitation changes is seen when visitor spending is applied to the visitation trends. For example, the average visitor to Dominguez Escalante National Conservation Area spends \$62.97 per visit in the unit's gateway communities. Provided that visitor *characteristics* remain relatively stable at the unit over time, if Dominguez Escalante NCA follows the average growth pattern for the National Monuments and NCAs program of 5.4%, it can expect an increase of about 5,000 visitors in the next year from its 2016 total of 93,000. Applying the spending average of \$62.97 per visit means that total spending in the community can be expected to increase by over \$300,000 next year. If visitation continues to grow as it has in the past, that spending amount can be expected to increase year after year. Comparatively, if the unit grew at the average rate for all BLM sites of 1.3%, it would expect an increase of only about 1,200 visitors in the next year. This would amount to a much smaller increase of only \$76,000, which is over \$220,000 less than the total from assuming its current growth pattern will continue. This is of course just a hypothetical example, since significantly higher growth rates may not necessarily be sustained and fluctuate greatly from year to year, but its purpose is to illustrate the idea that high growth monuments and NCAs have the *potential* to bring substantial increases in economic opportunity in gateway communities over time.

***National Conservation Lands: Closer than you think!***

- ✓ **99%** of cities (259 cities total) of 50,000 or more people in the 12 western BLM states are within just 50 miles of at least one National Conservation Lands unit.
- ✓ **56%** of all units are located within 60 miles of a city of 50,000 or more people
- ✓ **30** large cities of 100,000 or more people have a BLM Wild & Scenic River less than 100 miles away
- ✓ **13** major cities of 500,000 or more people are located within 60 miles of a Scenic or Historic Trail
- ✓ **29** National Monuments, NCAs or similarly designated areas are located within 60 miles of a city of 50,000 or more people

The difference in growth rate between designated units and other BLM lands does not mean that a designation itself leads to higher growth rates, but rather that designated units provide recreational opportunities that are seeing faster visitation growth than average BLM sites. One way to consider the effect of a new designation more closely is to compare visitation before and after designation. There are relatively few units for which this information is available, making it difficult to draw a conclusion regarding the "average effect" of a designation. However, data for 20 units considered showed different effects. For almost all units, there was an upward trend in visitation over time but in some cases visitation actually decreases after designation, while in others visitation significantly increases. Decreased visitation may be due to many factors, including changes in the staff in charge of entering visitation data into the RMIS database, or general changes in tourism resulting from economic conditions during the year of designation. Of 20 units considered, 15 experienced increased visitation the year of designation.

**4.3: Economic Contributions****4.3.1 National Monuments and NCAs**

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Economic contribution estimates are based on visitation and visitor expenditures (i.e., how much visitors spend on different goods and services). Many BLM National Monuments and NCAs have multiple entry points and some lack a visitor services station through which most visitors pass. This makes it difficult to track visits and even more difficult to estimate visitor spending patterns. Several other federal agencies do, however, track visitor expenditures. The US Forest Service, Fish and Wildlife Service, and National Park Service each has survey data that is used to prepare economic contributions reports (USFS 2015, Thomas and Koontz 2016, Carver and Caudill 2013). For this report, estimates of visitor spending are based on comparable data from the NPS Visitor Services Project (VSP) associated with NPS sites located with or near NCL units. While National Forests were also considered as potential sites to match with National Conservation Lands, the generic and park specific profiles for National Parks visitors developed by Thomas and Koontz (2016) are considered to better represent visitors to the National Conservation Lands.

Thomas and Koontz (2016) created four generic visitor characteristic profiles from a set of surveys of visitors to 54 different NPS sites. An NPS site is assumed to fall into one of each of the four categories: parks with lodging, parks with camping inside, historical sites, or recreational areas. Since lodging constitutes the highest individual spending category, parks with lodging are characterized by higher overall spending per visit. BLM National Monuments and NCAs fall into the three non lodging categories. For this report, National Monuments and NCAs were matched with the *closest* NPS unit in GIS and visitor characteristics from the comparison site were transferred to the unit. For parks that had been surveyed, visitor characteristics from that park's survey were applied, and for units that had not been surveyed, the generic profile that applied to the unit was transferred. In cases where a unit was matched to an NPS site with lodging, the next closest site was selected for comparison. This method standardized the process for matching NCL units to VPS visitor characteristics and spending patterns. More details about this methodology are available in Appendix A. A visitor characteristic transfer approach has been used in multiple reports on the economic benefits of other BLM recreation sites, but this is the first study to date to use data from the VSP for the National Conservation Lands (Lee, Rempel and Ainsworth 2014, BBC Research 2014, and BLM 2016d).

Commented [KLM16]: VSP

Visitation data, spending data, and state level IMPLAN models were used to estimate the labor income, value added, economic output, and jobs supported by 45 National Monuments and NCAs in the unit's state.<sup>3</sup> The results for each unit are presented below and in a table at the back of this report. The analysis was also completed for FY2014 and 2015. To be clear, this analysis does not imply that these jobs are *created* by the unit, rather that these are supported by visitor spending. Some of the reported jobs would still exist without tourism generated from the National Conservation Land units results do not suggest that these jobs are necessarily created by the unit. Some would exist without tourism generated from the NCL unit. Additionally, since this analysis only tracks visitor spending on trip related goods and services, it does not directly calculate jobs associated with monument management. For the

<sup>3</sup> This analysis includes all units designated as of November, 2016, but excludes Sand to Snow National Monument in California. Sand to Snow was designated in February 2016 and does not yet have a virtual office in the RMIS database so visitation data for 2016 was not available at the time of this report.

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most part, BLM jobs are distinct from other jobs supported by visitation measured in an IMPLAN analysis.

**National Monuments, NCAs and Similar Designations Economic Output, 2014-2016**

Year	Visits	Employment	Labor Income	Value Added	Output
2014	7,937,418	6,008	\$192,071,679	\$306,337,540	\$518,097,511 (in \$2013)
2015	7,586,062	6,174	\$199,098,801	\$317,438,461	\$540,746,813 (in \$2014)
2016	8,620,554	7,133	\$233,093,932	\$371,652,309	\$633,672,379 (in \$2015)

(b)(5) DPP

State level results are also presented below:

**Economic Contributions of National Monuments and NCAs, State-by-State Results, 2016**

State	Employment	Labor Income	Value Added	Output
AK	20	\$649,789	\$1,013,465	\$1,730,183
AZ	502	\$17,204,021	\$28,422,102	\$47,189,885
CA	972	\$38,005,511	\$58,542,534	\$96,974,850
CO	716	\$25,130,877	\$41,510,269	\$69,360,240
FL	97	\$2,980,746	\$4,443,253	\$7,417,072
ID	156	\$3,864,912	\$6,147,126	\$11,617,480
MT	61	\$1,644,963	\$2,454,195	\$4,653,150
NM	1,206	\$32,135,777	\$51,903,957	\$94,310,194
NV	1,340	\$48,490,891	\$77,373,811	\$123,897,291
OR	794	\$23,966,797	\$36,308,463	\$64,557,956
UT	1,183	\$36,148,882	\$58,515,201	\$105,396,719
WA	85	\$2,870,768	\$5,017,934	\$6,567,359
<i>All</i>	<i>7,133</i>	<i>\$233,093,932</i>	<i>\$371,652,309</i>	<i>\$633,672,379</i>

Unit level results are presented below. The unit level results are to be interpreted as economic contributions to the state's economy, based on the spending that occurs within 50 miles of a unit on trip related purchases. The results also provide an estimate of how incremental increases in visitation can impact local economies. On average, a single additional visit generates around \$53.30 in local area spending, and \$73.50 in state economic activity. Nonlocal visitors who spend the night in the area at a hotel or lodge generate the most money for the state economy, while local day visitors spend the least. The wide range in spending per visitor type underscores the importance of tracking visitor characteristics to each individual unit. An influx of visitors traveling from outside the local area to a unit would represent a larger economic impact than an increase in local day visitors. Even if visitation data were available for before and after a unit designation, the characteristics of the visitors would be an important consideration in determining the economic impact.

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Unit	NPS Visitor Profile Used	Total Spending	Employment	Labor Income	Value Added	Output
Steese NCA	North Cascades	\$1,340,664	20	\$649,789	\$1,013,465	\$1,730,183
Sonoran Desert	Organ Pipe Cactus	\$3,046,196	46	\$1,577,959	\$2,612,281	\$4,335,516
Las Cienegas NCA	Saguaro	\$1,680,107	25	\$870,312	\$1,440,784	\$2,391,222
Vermilion Cliffs	Canyon de Chelly	\$16,386,713	246	\$8,488,479	\$14,052,512	\$23,322,486
Ironwood Forest	Saguaro	\$1,401,970	21	\$726,234	\$1,202,267	\$1,995,362
Agua Fria	Montezuma Castle	\$4,408,236	70	\$2,344,596	\$3,845,477	\$6,393,624
Grand Canyon Parashant	Pipe Spring	\$1,802,957	27	\$933,950	\$1,546,135	\$2,566,069
Gila Box Riparian NCA	Chiricahua	\$1,489,474	22	\$771,562	\$1,277,307	\$2,119,903
San Pedro Riparian NCA	Coronado	\$2,803,196	44	\$1,490,928	\$2,445,338	\$4,065,704
Mojave Trails	Mojave	\$9,137,290	144	\$5,552,096	\$8,513,083	\$14,117,516
Berryessa Snow Mountain	Lassen Volcanic	\$6,371,835	95	\$3,768,188	\$5,829,386	\$9,643,524
Fort Ord	Pinnacles	\$26,180,698	412	\$15,908,191	\$24,392,183	\$40,450,331
Piedras Blancas Historic Light Station ONA	Pinnacles	\$369,895	6	\$224,759	\$344,625	\$571,503
Carrizo Plain	Lassen Volcanic	\$3,185,917	48	\$1,884,094	\$2,914,693	\$4,821,762
Santa Rosa and San Jacinto Mountains	Joshua Tree	\$6,100,756	89	\$3,610,577	\$5,630,450	\$9,308,432
California Coastal	Channel Islands	\$2,579,387	39	\$1,525,403	\$2,359,798	\$3,903,802
Headwaters Forest Reserve	Redwood	\$2,290,973	34	\$1,354,840	\$2,095,937	\$3,467,299
King Range NCA	Redwood	\$7,063,731	105	\$4,177,363	\$6,462,379	\$10,690,681
Browns Canyon	Colorado	\$6,835,138	140	\$4,894,559	\$8,084,655	\$13,508,793
Dominguez Escalante NCA	Colorado	\$5,518,891	85	\$2,970,844	\$4,907,131	\$8,199,412
McInnis Canyons NCA	Colorado	\$14,512,647	223	\$7,812,223	\$12,903,946	\$21,561,431
Canyons of the Ancients	Hovenweep	\$5,321,486	82	\$2,864,580	\$4,731,609	\$7,906,129
Gunnison Gorge NCA	Black Canyon Of The Gunnison	\$12,239,673	188	\$6,588,671	\$10,882,928	\$18,184,475
Jupiter Inlet Lighthouse ONA	Castillo de San Marcos	\$6,013,612	97	\$2,980,746	\$4,443,253	\$7,417,072
Craters of the Moon	Craters of the Moon	\$117,842	2	\$49,136	\$78,941	\$148,802
Morley Nelson Snake River Birds of Prey NCA	Hagerman Fossil Beds	\$8,487,149	154	\$3,815,775	\$6,068,185	\$11,468,678

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Pompeys Pillar	Little Bighorn Battlefield	\$1,604,480	29	\$781,209	\$1,167,240	\$2,218,923
Upper Missouri River Breaks	Bighorn Canyon	\$1,921,052	32	\$863,754	\$1,286,955	\$2,434,227
Organ Mountains Desert Peaks	White Sands	\$19,871,585	306	\$8,141,814	\$13,018,966	\$23,574,571
Rio Grande del Norte	Bandelier	\$10,512,042	169	\$4,524,959	\$7,364,043	\$13,389,555
Prehistoric Trackways	White Sands	\$1,259,126	19	\$515,891	\$824,923	\$1,493,759
Fort Stanton Snowy River Cave NCA	White Sands	\$1,846,182	28	\$756,420	\$1,209,535	\$2,190,210
Kasha Katuwe Tent Rocks	Bandelier	\$31,351,020	504	\$13,495,197	\$21,962,454	\$39,932,886
El Malpais NCA	El Malpais	\$10,570,254	179	\$4,701,495	\$7,524,037	\$13,729,213
Basin and Range	Great Basin	\$7,129	0	\$3,629	\$5,857	\$9,335
Sloan Canyon NCA	Lake Mead	\$2,869,929	38	\$1,379,105	\$2,197,814	\$3,520,615
Black Rock Desert High Rock Canyon Emigrant Trails NCA	Lava Beds	\$6,647,572	77	\$2,864,040	\$4,660,396	\$7,419,830
Red Rock Canyon NCA	Lake Mead	\$92,072,360	1225	\$44,244,117	\$70,509,743	\$112,947,510
Steens Mountain CMPA	John Day Fossil Beds	\$10,473,739	171	\$5,223,316	\$7,858,658	\$13,965,946
Cascade Siskiyou	Redwood	\$11,774,944	200	\$6,103,752	\$9,326,340	\$16,572,959
Yaquina Head ONA	Fort Vancouver	\$23,706,994	423	\$12,639,729	\$19,123,465	\$34,019,051
Red Cliffs NCA	Cedar Breaks	\$8,969,163	152	\$4,602,292	\$7,421,168	\$13,357,546
Beaver Dam Wash NCA	Lake Mead	\$402,724	7	\$196,995	\$311,364	\$562,782
Grand Staircase Escalante	Capitol Reef	\$60,637,361	1024	\$31,349,595	\$50,782,668	\$91,476,392
San Juan Islands	San Juan Island	\$5,896,600	85	\$2,870,768	\$5,017,934	\$6,567,359
<b>Total</b>		<b>\$459,080,688</b>	<b>7133</b>	<b>\$233,093,932</b>	<b>\$371,652,309</b>	<b>\$633,672,379</b>

## 4.3.2 Wilderness Areas

Modeling the economic contributions of BLM Wilderness visitors is challenging due to a lack of visitation data. There are over 220 Wilderness Areas and over 500 WSAs managed by the BLM, many of which have several different recreation sites in their boundaries. Unlike National Monuments and NCAs, which generally report visitation at the unit level, Wildernesses and WSAs do not report visitation data as a unit. This means that Wilderness visitation and other economic data must be estimated using a different method than monuments and NCAs. Wilderness Areas are in some ways similar to National Monuments and NCAs, but they have unique management challenges and different capacities for

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visitors. The difference between Wilderness or WSA visitors and National Monument or NCA visitors is not known.

BLM Wilderness Areas are part of the National Wilderness Preservation System (NWPS). Hjerpe et al (2016) estimated the economic contribution associated with NWPS visitors based on visitation and expenditure data from the USFS National Visitor Use Monitoring Survey (NVUM). Assuming that USFS Wilderness visits, which are tracked by the agency, constitute 80% of all NWPS visits, the study found that NWPS visitors contribute \$737 million to the national economy. With some additional assumptions, these results provide some insight into the contributions of BLM Wilderness visitors. In Hjerpe's analysis, visitor expenditures are the same regardless of the managing agency, so the national contribution of one visitor to NWPS lands is about \$74.<sup>4</sup> Bowker et al (2014) assume that roughly 3% of all NWPS visits are to BLM and FWS Wilderness Areas. The FWS manages 75 Wilderness Areas, ten of which are closed to visitation, while the BLM manages 223. Conservatively, assuming that about half the remaining proportion of all Wilderness visits is to BLM Wilderness Areas, this means that roughly 150,000 visits to BLM Wilderness Areas took place in 2014. Applying the value of \$74 in national economic contributions per visit gives an estimated total of \$11.1 million in national economic contributions from BLM Wilderness visitors.

Many Wilderness Areas are within National Monuments or NCAs. For example, the Paria Canyon Vermillion Cliffs and Coyote Buttes Wilderness Areas fall within the Vermillion Cliffs National Monument in Arizona and. The Vermillion Cliffs National Monument supports \$59.41 in spending per visit and \$84.55 in economic output supported per visit.

Unlike many other BLM Wilderness Areas, the Paria Canyon Vermillion Cliffs and Coyote Buttes Wilderness Areas track wilderness visits. Of the 275,845 visits to Vermillion Cliffs National Monument, an estimated 41,749 were to the wilderness areas (RMIS 2016). Assuming these wilderness visitors have the same visitor characteristics and spending patterns as other visitors to the monument, \$2.48 million in spending, \$3.53 million in output and 37 jobs are supported by the wilderness visitors to the monument. The actual economic contributions of these visitors may be more or less than this modeled amount, but this cursory analysis demonstrates that there is overlap between wilderness and monuments. An additional benefit from these areas is their \$207,501 in revenue received from permits issued in 2016.

<sup>4</sup> Note that this amount is based on a national IMPLAN model, which reports a higher output per visit than a local or state model. These expenditure profiles are based on USFS NVUM data, not the NPS VPS data used for the National Monument and NCA estimates in this report.

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**4.3.3 National Wild and Scenic Rivers and National Scenic and Historic Trails**

The National Wild and Scenic Rivers and National Scenic and Historic Trails systems preserve many high value cultural and natural resources. The BLM does not track visitation to all rivers and trails, many of which are co managed with other agencies. Several sites do, however, track river specific or trail section specific visitation. Many of these features pass through National Monuments or NCAs, further highlighting the overlapping nature of the many different areas of the National Conservation Lands.

National Historic Trails preserve the routes of some of the most significant cultural routes in American history. In Baker City, Oregon, the National Historic Oregon Trail Interpretive Center (NHTIC) is one popular site for visitors to see some of the last remaining tracks from the Oregon Trail. Here visitors can learn about the history of westward expansion and take in the same views as the original pioneers saw as they made their journey to start a new life. In 2016, NHTIC hosted over 35,000 visitors. Applying the same economic contribution analysis as was done for National Monuments and NCAs, this center supported \$2.5 million in state economic activity and over 30 jobs in the area.

BLM's National Wild and Scenic Rivers (NWSR) program preserves the free flowing nature of 69 rivers across the western US. Many of these rivers are either co managed or have multiple entry points. A visitor might put in to the river outside of a BLM managed section, float through and take out past the BLM portion. This makes the accurate counting of river visitation a significant challenge to the BLM. The Deschutes Wild and Scenic River in Oregon hosted 245,126 visits in 2016 for a variety of recreational uses. Applying the same economic contribution analysis methodology as was done for National Monuments and NCAs, this designated river unit supported \$15 million in state economic activity and nearly 200 non federal jobs in Oregon.

Many Wild and Scenic Rivers (WSRs) flow through National Monuments and NCAs. At Upper Missouri River Breaks National Monument (UMRBNM), for example, 16,922 of the monument's 46,342 visits were to the Upper Missouri National Wild and Scenic River. Assuming, as in the wilderness example, that these visitors have similar characteristics to the average monument visitor, then the economic contributions attributable *just* to the WSR visitors can be calculated from the monument's model. This means that of the \$1.9 million in spending and the \$2.4 million in economic output supported at UMRBNM in 2016, \$701,400 of spending and \$888,900 in output was supported by the WSR visitors.

Due to the overlapping nature of these designations, estimates of the economic contributions from each of the program areas separately may be greater when summed than the contributions to the entire National Conservation Lands.

**4.4 Economic Values**

As discussed in Section 3, some of the values provided by National Conservation Lands relate to the economic opportunity, stability, and diversity the activities on these lands bring to neighboring communities. Why the economic contribution estimates reported above are not direct estimates of

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these values, they do convey some information on the magnitude of values, and the variation across units. In addition, the National Conservation Lands support a wide range of nonmarket values realized both locally and nationally. Estimating these values is difficult and typically done through site specific

***Educational Values of BLM's East Coast Lighthouse***

Jupiter Inlet Lighthouse Outstanding Natural Area (JILONA) demonstrates how an urban unit with an active partnership group can help connect a community with the environment. The Loxahatchee River Historical Society, a partner group of JILONA which runs the museum and provides visitor services, put on a first-ever event called Sea Fest for Kids in February 2016. The maritime-themed fun and educational event brought nearly 4000 visitors together to learn about the history of the lighthouse and the marine life of Jupiter Inlet. Fourth graders in attendance all received Every Kid in a Park passes from BLM staff at the event. A lone area of naturalness and preserved history on the Atlantic Coast of Florida, JILONA has a very high educational and cultural value, and popular events like Sea Fest for Kids help to capture that value. Applying a \$48 per day use value of a historical site visit from the Recreation Use Values Database implies an economic use benefit of about \$190,000 for the one-day event.

valuation studies and benefit transfers of existing literature. BLM wilderness areas, for example, are a part of National Wilderness Preservation System (NWPS), which includes areas managed by the National Park Service, Fish and Wildlife Service, and Forest Service. Hjerpe et al (2016) estimated that nearly 10 million people visited NWPS lands in 2014, of which 80% were to Forest Service units. A recent synthesis of studies on the economic value of Wilderness suggests that the current use value of wilderness recreation is nearly \$84 per visit (Bowker et al 2014). Applying this figure to an estimated 9.9 million visitors in 2014 provides an economic use value of NWPS recreation of about \$832 million. Additionally, Bowker et al (2014) estimate that the ecosystem services of climate regulation and waste treatment by the NWPS provided a value of \$30 per acre in avoided costs to local communities. This amounts to \$3.5 billion annually in value for the entire NWPS (110 million acres) or \$262 million of ecosystem service value of BLM Wilderness (8.7 million acres).

Property values are also substantially influenced by the presence of nearby Wilderness. Two studies have been conducted to estimate the change in housing price in response to wilderness designation, both of which show a positive relationship (Phillips 2004, Izon et al 2010). Phillips (2004) finds that residential property values in New England increased 19%, or over \$20,000 per acre, by a wilderness designation near a town. Izon et al (2010) found that for each 1% increase in wilderness land per Census tract, housing prices rose between 0.64% and 1.19%. Both studies provide econometric evidence that protected lands positively impact home values, supporting the conclusions of Taylor et al (2012) and Rasker (2012).

The National Historic Oregon Trail Interpretive Center also provides an important value to visitors, through historical education and interpretation that takes place on the unit. The Recreation Use Values Database, a collection of economic studies that have valued consumers' willingness to pay for different types of outdoor recreation activities, contains 42 individual studies that are categorized as valuing economic value of visits to historic sites. The average value from these 42 studies, which contain nearly 150 individual estimates, is \$48 per person, per day. If the average estimated use value were characteristics of NHTIC, its annual use value would be \$1.8 million.

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Estimating the Economic Use Value of NHTIC	
a. Average Economic Use Value of a Historic Site Visit*	\$48
b. Number of Visits to NHTIC, 2016	37,777
c. Estimated Economic Use Value of NHTIC (a x b)	\$1,810,000
<p>*source: Recreation Use Values Database. 2016. Corvallis, OR: Oregon State University, College of Forestry. Retrieved Jan 6, 2017 from <a href="http://revaluation.forestry.oregonstate.edu/">http://revaluation.forestry.oregonstate.edu/</a>.</p>	

Wild and Scenic Rivers also provide important nonmarket values, from offering outstanding recreational opportunities to protecting important riparian areas. Some of the many ecosystem services of rivers include flood prevention, riparian habitat conservation, and water quality. At the Deschutes Wild and Scenic Rivers, recreation visitors realized a significant use value from various types of water based recreation. Including only visits for river based recreation, the Deschutes Wild and Scenic River provided \$29.8 million of economic use value in 2016. It is important to note that the actual value to visitors to the Deschutes Wild and Scenic River may be higher or lower than this calculated amount. The analysis assumes that visitors to the river assign the same value to recreational experiences at the unit as the average of all surveys of boating and fishing recreation visitors in the Intermountain region of the United States contained in the USGS Benefit Transfer Toolkit (USGS 2016). The analysis also assumes that a separate value exists for both boating and fishing activities on the unit, even though it is likely that some visitors participate in both activities. Since a single visit might entail participation in multiple activities, activity visitor counts are recorded by visitor days (a single visit lasting twelve hours, or multiple visits adding up to twelve hours total for one visitor day) and participants (one person participating in a given activity for an unspecified amount of time). Economic value is recorded in per person per day amounts and does not specify length of time of activity participation. For this reason, "participant" counts provides a better match for estimating economic use value than visitor days.

Nonmarket Use Value of Deschutes Wild and Scenic River			
Recreation Type	Participants (RMIS 2016, report #19)	Per person per day Economic Value (USGS 2016)	Economic Use Value (\$2015)
Boating (Motorized and Nonmotorized)	200,846	\$82.79	\$16.6 million
Fishing	176,130	\$74.84	\$13.2 million
			Total \$29.8 million

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Ecosystem services are the benefits that ecosystems provide to people, often categorized into provisioning, regulating, habitat, and cultural services. National Conservation Lands provide each of these services in several ways, but the magnitude and scope of the benefits provided by each service varies considerably across different units. For example, Cascade Siskiyou National Monument in southern Oregon has some of the greatest biodiversity of any area in the country, providing high *habitat service* values. Canyons of the Ancients in Colorado, on the other hand, protects one of the highest densities of cultural sites. Preserving these ancient dwellings and artifacts provides significant cultural service values. Additionally, the BLM's various landscapes from forested, riparian, sagebrush steppe to tundra each provide very different types of values to people.

An important concept of ecosystem services is that ecosystems can and should be assessed by federal land managers, when feasible, according to Presidential Memorandum M 16 01. Small scale ecosystem service assessments for Resource Management Plans and associated environmental analyses can provide valuable insights into weighing alternatives. An ecosystem services assessment may begin by identifying the types of services provided by a unit. Appendix B of this report provides a starting point in identifying the ecosystem services provided by the unit. Once identified, any values that are deemed highly important and/or are likely to be impacted by a decision should be researched further for the feasibility of valuation. A zoned socioeconomic specialist with the BLM can provide support in identifying options for conducting an ecosystem services valuation. An example of a valuation technique for endangered species habitat protection is described in the case study of Grand Canyon Parashant

**Executive Memo: Incorporating Ecosystem Services Into Federal Decision Making**

Executive Memo M-16-01, released in October 2015, "directs agencies to develop and institutionalize policies to promote consideration of ecosystem services, where appropriate and practicable, in planning, investments, and regulatory contexts..."

An ecosystem-services approach can: (1) more completely inform planning and decisions, (2) preserve and enhance the benefits provided by ecosystems to society, (3) reduce the likelihood of unintended consequences, and, (4) where monetization is appropriate and feasible, promote cost efficiencies and increase returns on investment.

National Monument in Section 5.

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**Section 6: Unit Example of Assessing the Economic Value of a National Monument or NCA**

**Grand Canyon Parashant National Monument**



(Photo: A BLM Ranger looks onto Grand Canyon Parashant National Monument, *Bob Wick, BLM*)

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Grand Canyon-Parashant At a Glance	
State	Arizona
Designated	1/11/2000
Acres	1,048,321 (812,581 BLM)
Counties in Planning Area	Mohave County, Arizona. Also includes parts of Coconino (AZ), Washington (UT) and Clark (NV) Counties
Budget (2015)	\$1,093,906 (plus \$1,616,700 from NPS; \$237,581 in project funding)
Visits ('16)	30,350
Visitor Days ('16)	18,014
Top five types of recreation visits	<ol style="list-style-type: none"> <li>Driving for pleasure</li> <li>Off-highway vehicle use</li> <li>Camping</li> <li>Hunting-other</li> <li>Hunting-big game</li> </ol>
SRPs Issued and Active (2015)	5 issued (all for hunting) 36 active (33 for hunting)
Nearby Major Cities (current est. population)	Las Vegas, NV (600,000) St. George, UT (75,000) Bullhead City, AZ (40,000)
Similar Recreation Sites	in southern Nevada, Mohave County has a population just over 200,000, and the county seat, Kingman, is located just south of the monument. Mohave County has consistently experienced higher rates of unemployment than the state of Arizona, and significantly lower per capita

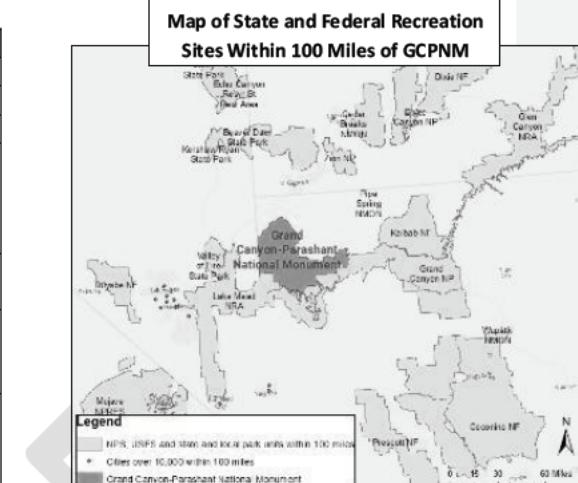
## Key Facts:

The monument is co managed by the BLM and National Park Service.

There are 21 USFS, NPS, and local and state park units within 100 miles of the unit, and six BLM NMs and NCAs.

The monument is known for its remoteness and vast open space at the intersection of the Sonoran, Mojave, and Great Basin ecosystems.

GCPNM attracts big game hunters as well as other visitors seeking its outstanding opportunities for solitude and unconfined recreation.



### About the Economy of the Grand Canyon-Parashant National Monument Region

Grand Canyon-Parashant National Monument (GCPNM) is

located entirely in Mohave County, in northwestern Arizona.

The main access point for the monument travels through

Bullhead City, AZ (40,000)

Washington County in southwestern Utah and Clark County

Grand Canyon NP, Pipe Spring NM,

Dixie NF, Zion NP, Valley of Fire SP,

Lake Mead NRA, Beaver Dam SP,

south of the monument. Mohave County has

NCA, Red Cliffs NCA, and

Kiabab NCA.

Mohave County has

consistently experienced higher rates of

unemployment than the state of Arizona, and significantly lower per capita

is over 65, over half

Non labor income

about one fifth of

and tourism. The

payments for its

county is managed by

LM's disbursements

county, mostly from

the state of Arizona,

higher rates of poverty,

The county is also

of population and

located in Headwaters

Economics' Economic Profile System, 2016)

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## 2016 Economic Contributions from Visitor Spending

NATIONAL CONSERVATION LANDS		Regional Economic Contributions of National Monuments and National Conservation Areas														
Site Name	Grand Canyon-Parashant	Visits (2016)	30,350	Acres												
State	AZ	15yr Average Annual Visitation Growth	15.83%	808,747												
Date of Designation	1/1/2000	15yr Median Annual Visitation Growth	10.53%	NPS Comparison Site used for Visitor Characteristics Pipe Spring												
<b>2016 Visitor Spending by Sector</b>			Table 1: Economic Contributions from Visitors to Grand Canyon-Parashant													
			<table border="1"> <tr> <td>Average Expenditures per Visit</td><td>\$59.41</td></tr> <tr> <td>Total Expenditures</td><td>\$1,802,957</td></tr> <tr> <td>Non-BLM Jobs Supported</td><td>27</td></tr> <tr> <td>Labor Income Supported</td><td>\$933,950</td></tr> <tr> <td>Value Added</td><td>\$1,546,135</td></tr> <tr> <td>Total Economic Output Supported</td><td>\$2,566,088</td></tr> </table>		Average Expenditures per Visit	\$59.41	Total Expenditures	\$1,802,957	Non-BLM Jobs Supported	27	Labor Income Supported	\$933,950	Value Added	\$1,546,135	Total Economic Output Supported	\$2,566,088
Average Expenditures per Visit	\$59.41															
Total Expenditures	\$1,802,957															
Non-BLM Jobs Supported	27															
Labor Income Supported	\$933,950															
Value Added	\$1,546,135															
Total Economic Output Supported	\$2,566,088															
Table 2: Budget, Volunteer Hours, and Revenue		Table 3: Economic Contributions in Context														
<table border="1"> <tr> <td>FY15 Budget</td><td>\$1,093,906</td></tr> <tr> <td>Volunteer Hours (2015)</td><td>1,482</td></tr> <tr> <td>Value of Volunteer Contributions</td><td>\$53,834</td></tr> <tr> <td>FY15 Revenue</td><td>\$39,598</td></tr> </table>			FY15 Budget	\$1,093,906	Volunteer Hours (2015)	1,482	Value of Volunteer Contributions	\$53,834	FY15 Revenue	\$39,598	<table border="1"> <tr> <td>Economic output supported per \$1 of FY15 budget</td><td>\$2.35</td></tr> <tr> <td>Economic output supported per acre</td><td>\$3.17</td></tr> </table>		Economic output supported per \$1 of FY15 budget	\$2.35	Economic output supported per acre	\$3.17
FY15 Budget	\$1,093,906															
Volunteer Hours (2015)	1,482															
Value of Volunteer Contributions	\$53,834															
FY15 Revenue	\$39,598															
Economic output supported per \$1 of FY15 budget	\$2.35															
Economic output supported per acre	\$3.17															
Table 4: Yearly Economic Contributions		FY 2015 (in \$2014)														
		<table border="1"> <tr> <th>Visits</th><th>Total Spending</th><th>Jobs Supported</th><th>Output Supported</th></tr> <tr> <td>31,188</td><td>\$1,783,873</td><td>27</td><td>\$2,515,800</td></tr> </table>			Visits	Total Spending	Jobs Supported	Output Supported	31,188	\$1,783,873	27	\$2,515,800				
Visits	Total Spending	Jobs Supported	Output Supported													
31,188	\$1,783,873	27	\$2,515,800													

Grand Canyon Parashant's extremely rural and hard to reach location keeps its annual visitation low, in 2016, only about 30,000 visits took place. However, it has experienced consistent visitation growth since its designation in 2000, when it had only received about 13,000 annual visits. Despite low visitation compared to other units, the unit contributed an estimated \$2.6 million in economic activity to the regional economy. The more than \$1.8 million in visitor spending supported 27 jobs in the state in 2016, and the total economic contributions amounted to about \$2.35 per dollar of budget and just over \$3.17 per acre. A table describing the resources, objects and values of the monument in more detail in the appendix of this report identifies many of the important nonmarket values and ecosystem services associated with this unit.

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**Economic Value of Grand Canyon-Parashant National Monument****Value of Recreation**

As identified in the resources, objects and values described in Proclamation 7265, the executive order establishing the monument, there are many important values associated with GCPNM. See table 1 attached to this reference sheet for a more thorough discussion of these ROV's and their associated economic values. The monument brought 30,350 visits in 2016, most of which occurred on the 810,000 acres managed by the BLM. The monument charges no entrance fees, thus visitors are able to obtain a benefit from their recreational experience without having to pay any money. These experiences provide a value to consumers greater than the \$0 they paid, a value described by economists as consumers' willingness to pay. To date, no original study measuring willingness to pay for recreation has been conducted on Grand Canyon Parashant National Monument. There have been, however, many studies conducted in the intermountain region of the United States that have valued the different types of recreation offered at the monument. To estimate the net benefit of recreation opportunities at the monument, the average values of recreation days derived from studies in the intermountain region were used, as reported in the USGS Benefit Transfer Toolkit (USGS 2016). The table below shows the average values used, the number of activity participants in 2016 of each recreation type, and the total economic value, calculated by multiplying the average value by the number of visitor days spent at that recreation type in 2016. A full listing of the studies used to derive these average values can be found on the interactive USGS Benefit Transfer Toolkit webpage, along with a more detailed description of the methodology and how it may be applied to another recreation site.

*Recreation Net Value: \$2,417,700*

**Calculating the Economic Value of Recreation at Grand Canyon Parashant**

Recreation Type	Participants (2016)	Average Value (in \$2015)	Total Value
Camping	6,056*	\$22.14	\$134,100
General Recreation	20,720	\$53.51	\$1,109,000
Hunting big game	1,978	\$87.17	\$174,400
Hunting other	2,571	\$64.98	\$167,100
Mountain Biking	606	\$196.39	\$119,000
Hiking	1,583	\$96.08	\$152,100
OHV	9,084	\$61.87	\$562,000
<b>Total</b>		<b>\$2,417,700</b>	

"Participants" represent one visitor engaging in a particular activity for an unspecified amount of time. One visitor may participate in multiple activities in one day, so the total number of "participants" may be greater than the total number of visits. "Participants" are for 2016 from BLM's RMIS database, report #19. The average values are taken directly from the Benefit Transfer Toolkit's "Average Values" tab for each recreation type in the *Intermountain* region.

\*Camping is reported in visitor days, since camping is an overnight activity. One individual on an overnight camping trip, for example, is two days of recreation but is only counted as one participant compared to two visitor days. Visitor days, then, is a more accurate representation of per-day camping participation and is used to estimate economic use value from that activity.

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**Value of Habitat Protection for desert bighorn sheep**

*Net Value: between \$1,638,000 and \$2,940,000 per year for residents of Mohave County, AZ*

GCPNM protects habitat for the threatened desert tortoise, as well as several species of birds and bats. It also protects habitat for a small herd of desert bighorn sheep. A 1985 study by King et al surveyed households in Tucson, AZ to assess willingness to pay to preserve habitat for a herd of desert bighorn sheep located less than 10 miles from the city. Using a contingent valuation survey and a sample of over 500

Tucson residents found that average willingness to pay to protect and restore habitat for a herd of 70 sheep facing habitat loss was between \$20.27 and \$36.37 per household per year (adjusted to 2015 dollars). The low value assumes that those households that did not respond to the survey place a value of \$0 on the desert bighorn sheep habitat, while the high value assumes that non respondents place the same value on the species habitat as the median respondent in the survey.

To estimate the value of conservation of desert bighorn sheep habitat, this per household per year value must be multiplied by the number of households that would be represented by the survey sample in King et al (1988). There are at least four large herds of desert bighorn sheep in the Arizona strip district whose population together totaled 550 on BLM managed lands in 1996 (BLM 2016b). Assuming that the herd on and near GCPNM is of comparable value to residents of Mohave County means that the value estimates of per household per year willingness to pay can be multiplied by the 80,832 households gives a conservative estimate of a total economic value for desert bighorn sheep of between \$1,638,000 and \$2,940,000 per year in 2015.

Other people outside Mohave County, Arizona may also place a benefit on bighorn sheep habitat in the area, but these values are not included in this analysis. It is also possible that protection of habitat for other wildlife in the area overlaps with values for desert bighorn sheep habitat. For example, Loomis and Eckstrand (1997) found that habitat protection for the Mexican spotted owl was worth 83% of the value of protecting a total of 62 threatened and endangered species. The desert bighorn sheep may share a similar relationship with other species in the area.

***Calculating Economic Value of Habitat Protection***

- a. Number of Households in Mohave County, AZ (US Census 2016): 80,832
- b. Estimated willingness-to-pay for desert bighorn sheep habitat protection (King et al 1988): \$20.27 - \$36.37 per household per year (\$2015)
- c. Total economic value of desert bighorn sheep habitat protection in GCPNM (a x b): \$1,638,000 - \$2,940,000 per year

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